

**The Role of Procedural Justice on Organizational Attractiveness in Game-Based  
Assessment**

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### Abstract

The influence of technology in recruitment and selection plays an important role in applicant reactions. As losing top candidates can be costly, maintaining a positive company image is important. This makes it necessary to identify the best methods for drawing in and assessing the most qualified candidates. Additionally, researchers recognize that selection from the applicant's perspective brings interesting variables to examine. Since applicants also select the organizations they apply to and where they are willing to work. Thus, if the selection is deemed unfavorable by the applicant, they might be less likely to accept a job from the organization. In the current study we investigated to what extent applicants perceived procedural justice influences their perceived organizational attractiveness when a game-based assessment (GBA) is used and to what extent this relationship is mediated by perceived opportunity to perform. Based on earlier findings in the literature, I propose that procedural justice has a positive effect on organizational attractiveness and that this effect is mediated by opportunity to perform. We conducted a cross-sectional study ( $N=103$ ), where we examined applicant attitudes and reactions through a questionnaire after they took part in a GBA. Results showed that procedural justice is a significant predictor of organizational attractiveness in GBA, partially mediated by opportunity to perform. I conclude that an increase in organizational attractiveness, when a high procedural justice was experienced during GBA, also partially via an experience of high opportunity to perform. Theoretical and practical implications are discussed.

*Keywords:* procedural justice, opportunity to perform, organizational attractiveness, game-based assessment

## Introduction

Technological advances have changed the way people live and work. Individuals can work from home through, for example, teleconferencing and portable computing devices, as well as be constantly connected to the workplace (e.g., email, chatting). As a result, technological evolution has made the workforce more flexible. Daily life processes have been automated in most aspects, allowing humans to do things with a click (e.g., on-line shopping, e-banking, e-learning) (Stone et al., 2015). In other words, ongoing technological advancements have changed how businesses attract, choose, encourage, and keep employees, thus having a significant and growing impact on hiring and selection as well as other business operations like performance management, training, and rewards. One of the most active research and practice fields in organizational psychology has been employee recruitment and selection. While traditional or settled research questions still remain, new recruitment and selection techniques are appearing and being used (Ryan & Ployhart, 2014). The influence of technology and digitization has already had a significant impact on employee recruitment and selection procedures. The impact of this interplay between technology and staff recruitment and selection is evident in applicant reactions research and practice as well (Nikolaou et al., 2019).

One of the ways technology is being used in recruitment and selection is through game design and thinking. There are various ways to implement game usage in this process. Gamification is the application of game components in non-game environments to elicit feelings and behaviors similar to those found in games (Chow & Chapman, 2013; Hamari et al., 2014). Game components include levels, badges, leaderboards, simulations, fantasy, rules or strategy, challenges, or dynamic graphics (Garris et al., 2002). Additionally, there are serious games, defined as any game that “does not have entertainment as its sole or primary purpose” (Pandeliev & Baecker, 2010, p. 239). This includes games developed by the

military for recruiting, training, or tactical simulations, persuasive or advertising games, games for disaster response, educational games for kids, games for learning foreign languages, online worlds like Second Life, exercise platforms like WiiFit, and an increasing number of mental fitness games (Pandeliiev & Baecker, 2010). Technological advancements have made it possible for gamification and games to be incorporated in the hiring process to create gamified and game-based assessments. Gamified assessment is the enhancement of traditional psychometric tests by including a game design component (Armstrong et al., 2016). Game-based assessments (GBA) are selection methods that include game components to measure an individual's suitability for a job (Bhatia, 2018; Wu et al., 2021). The potential of GBAs to boost candidate involvement is recognized by organizations. A variety of factors, such as cognitive capacity, personality, and other proven predictors of job success, can be measured using GBAs in an organizational setting (Ellison et al., 2020).

As previously stated, research has not kept pace with the influence of technology on employee recruiting and selection. Even Chow and Chapman (2013) said that no empirical research has established the validity and effectiveness of gamifying the recruitment process, however organizations have started to gamify elements of the recruitment process reporting positive results. Because the need to understand how to evaluate applicants' knowledge, skills, and abilities as well as other factors keeps growing as societies advance and employment opportunities increase. It is also necessary to know how to identify the best methods for each applicant and how to draw in the most qualified candidates and thereby knowing how to choose candidates who have the best combination of performance potential and organizational fit (Potočnik, et al., 2021). Therefore, more research has been done about the validity and effectiveness of gamification in the recruitment process, which has shown that gamification is a reliable and valid selection method (Nikolaou et al., 2019b). A game-based lens is also intriguing, because gaming mechanisms frequently provide

skill-based badges. Some people think that performance evaluation is a better strategy since it tries to analyze complicated abilities demonstrated through actual action rather than depending on a single right or wrong response. For example, why look only at intelligence, when observable skills across multiple different settings can be examined (Reiners & Wood, 2014). Reiners and Wood (2014) propose that game design uses the four keys of performance enhancement from Mumford et al. (1998). These four keys are

- Observations are made of actual performance in the specific domain of interest;
- Participants create their responses (rather than selecting response choices from a list);
- Inferences drawn are limited to domain-specific skills rather than used for broad generalizations (such as one's intelligence);
- Assessments of performance skills are made against a standard or rubric that reflects the quality of the observed behavior.

Additionally, Leutner et al. (2023) state that tests of cognitive capacity based on games are effective. They have strong convergent validity with established cognitive ability tests and evaluate cognitive ability properly. Understanding the effectiveness of gamification is also an important practical issue. There are already a surprisingly large number of businesses offering gamification services, and investments are being made in gamification-related initiatives. Gamification is discussed extensively, for instance, in industry chitchat, most of which is based on anecdotal and intuitive assumptions that can range from extremely unfavorable to extremely positive perspectives. Hence, empirical data on the success of gamification is needed (Hamari et al., 2014).

Some time ago researchers started to recognize that selection from the applicant's perspective also brings interesting variables to examine. Since applicants also select the organizations they apply to and where they are willing to work, the same as companies selecting their employees (Rynes, 1993). Hausknecht et al. (2004) offered five reasons for

researching applicant reactions. First, being the invasiveness of the selection, if the applicant finds the selection invasive they may think of the company as a less attractive option. Losing top candidates can be costly, so maintaining a positive company image is important (Murphy, 1986). Second, applicants with a negative selection experience might discourage other potential applicants from joining this organization (Smither et al., 1993). Third, if the selection is deemed unfavorable by the applicant, they might be less likely to accept a job from the organization (Macan et al., 1994). Fourth, if the selection was seen as invasive or inappropriate the applicant may be more likely to file legal complaints or a lawsuit, than applicants who experienced the selection as fair and face valid (Smither et al., 1993). Lastly, if the applicant felt mistreated during the selection process, they are less likely to reapply to the organization or buy the organization's products (Hausknecht et al., 2004). These five reasons provide a good indication of why researching applicants' reactions is so important. Commonly measured applicant reactions are the different components of organizational justice and organizational attractiveness.

With the use of the internet as a tool for recruitment and selection, organizations can reach a wider audience to find and choose top talent. Additionally, job hunters can apply for more openings faster. Organizations have invested significantly in modern assessment techniques as a result of the rising application rate. Yet, there is a problem with individuals' negative responses to psychometric tests. Psychological evaluations are less accepted by applicants than job interviews (Borman et al., 2023; Hausknecht et al., 2004), which is concerning because psychological evaluations tend to predict job performance more accurately (Schmidt & Hunter, 1998). GBA, which makes use of game components to make the assessment process more entertaining for candidates given that people find games to be enjoyable, offers a remedy for these reactions (Hamari et al., 2014). Yet, there are worries that gamification can be viewed poorly by applicants for jobs in important selection tests. For

instance, research indicates that candidates believe gamified evaluations to be less fair than conventional techniques when included in test batteries (Armstrong et al., 2016).

Given the importance of applicants' reactions in assessment and the need for empirical data for applicants' reactions in gamified assessments, this study was set up to look at the main research question: *To what extent does the use of game-based assessments influence selected applicant attitudes and reactions?* Within this research I will do my own sub-research, with the research question: *To what extent does perceived procedural justice during game-based assessment influence the perceived organizational attractiveness of the applicant and to what extent is this relation mediated by perceived opportunity to perform?*

### **Organizational Justice Framework**

This research is based on the organizational justice framework theory by Gilliland (1993). The organizational justice framework is a “justice model of applicants' reactions to selection systems” (Gilliland, 1993, p. 694). This model divides organizational justice into procedural justice and distributive justice. The perceived fairness of the methods used to make organizational decisions is referred to as procedural justice (Folger & Greenberg, 1985). Such perceptions of fairness are linked to attitudes toward organizations. The fundamental idea is that candidates believe a recruiting process to be more fair if the selection techniques appear fair. Organizations may be able to impact procedural justice in a favorable way. Thus, procedural justice is a key part of candidates' attitudes to personnel selection. Furthermore, distributive justice relates to the perceived fairness of decision results (Bauer et al., 2001).

When compared to traditional assessment methods, the use of a wide and new variety of game-based methods to assess applicants makes it less predictable to what extent applicants will perceive the assessment as fair. Procedural justice in gamification measures how much users believe the gamification process treats all participants equally. A high level



of perceived procedural justice is expected to contribute to the clarity of the challenge at hand, where participants understand how/what to do in order to receive a reward (Leclercq et al., 2020). Procedural justice from the organizational justice framework (Gilliland, 1993) is divided into ten procedural rules, which are categorized by, formal characteristics, explanation and interpersonal treatment. The explanation category is based on feedback, which will not be provided to applicants due to the limitations of this study. As a result, we will only examine the formal characteristics and interpersonal treatment. We will primarily focus on job relatedness for formal characteristics, and perceived propriety of tasks for interpersonal treatment. The degree to which a test appears to measure content relevant to the job situation or appears to be valid is referred to as job relatedness. Improper tasks and prejudicial tasks are both examples of task propriety (Gilliland, 1993).

According to Gilliland (1993), the opportunity to perform rule is based on the voice rule (Thibaut & Walker, 1975) and an applicant's voice can be interpreted as having sufficient opportunity to demonstrate one's knowledge, skills, and abilities in the selection setting (Arvey & Sackett, 1993). Opportunity to perform is also part of procedural justice but, is isolated in this study because not all of the procedural rules have received the same amount of attention in literature (Gilliland & Hale, 2005; Ryan & Ployhart, 2000). The applicant reactions literature has concentrated primarily on job relevance or job relatedness (Gilliland, 1993; Smither et al., 1993; Truxillo et al., 2001). Thus, the focus for this study is on the less researched opportunity to perform. Another reason to consider opportunity to perform is that, in game-based examinations, you may be more restricted to the rules that are specified, as opposed to an interview.

### **Organizational Attractiveness Framework**

This study is also based on Highhouse et al.'s (2003) organization attraction model, which explains three major components of organizational attraction. First, company

attractiveness, also known as general attractiveness, is defined as "preliminary attitudes about the company as a potential place for employment" (p. 992). Second, intentions toward the company, which are stated as future methods to dealing with the company, such as accepting a job offer from the company, are also described as plans to pursue. Third, there is company prestige, which is defined as "aspects of a company that are subject to social influence, such as reputation, popularity, and status." (p. 992).

This study focuses on the general attractiveness of the model, from now on referred to as organizational attractiveness. Chapman et al., (2005) argue that organizational attractiveness is one of the most important recruitment and selection outcomes. According to several studies, recruitment methods may influence organizational attractiveness (Hausknecht et al., 2004, Roberson et al., 2005). Gamified recruitment, as Collmus et al. (2016) point out, can be utilized to impact applicants' opinions of company image. As a result, applicants who respond positively to a gamified recruitment strategy may regard the firm as a more appealing place to work.

### **The relationship between perceived fairness and organizational attractiveness**

Singer (1993) identified that perceptions of selection fairness are related to job offer acceptance and perceptions of organizational attractiveness (Bauer et al., 1998). According to Bauer et al. (2001) organizations may be able to influence an applicant's perceptions of selection procedures, and thus their perceptions of the hiring process as a whole. This led to the first hypothesis:

*Hypothesis 1: Perceived procedural justice during a game-based assessment has a positive effect on perceived organizational attractiveness.*

Schleicher et al. (2006) found that opportunity to perform was found to be a key predictor of total procedural fairness in both qualitative and quantitative analyses. As a result, opportunity to perform concerns are likely to be more important to applicants than past

coverage in the fairness literature would imply. The findings indicate that opportunity to perform significantly influences fairness judgments in line with Gilliland's (1993) model and Truxillo et al. 's (2001) findings. The findings showed that the dimension of opportunity to perform is related to overall fairness. Combined with the aforementioned relationship between selection fairness and organizational attractiveness by Singer (1993), led to the second hypothesis:

*Hypothesis 2: Perceived opportunity to perform during a game-based assessment has a positive effect on perceived organizational attractiveness.*

There is little research to be found about the interaction of these three variables together. However, people's views can be significantly influenced by prior exposure to certain mechanics; for instance, a job candidate who has previously used a branching narrative in a job application may find them more comfortable (Landers & Sanchez, 2022). Another intriguing finding from exploratory studies was that, in the context of GBA, gaming comfort was significantly and positively associated with job-relatedness and opportunity to perform (Ellison et al., 2020). Furthermore, the favorable effect of the gamified assessment approach on candidates' organizational attractiveness directly and indirectly happens exclusively for those with extensive video gaming expertise (Gkorezis et al., 2021). According to Singer (1993), perceived procedural justice has a favorable impact on organizational attractiveness. However, the presence of opportunity to perform might make this effect even stronger. People's perception of the relevance and comfort of their work increases when they have the opportunity to actively engage in and participate in tasks. As a result, the beneficial effects of procedural justice on organizational attractiveness are strengthened. Furthermore, the relationship is strengthened for people with extensive video gaming expertise. They particularly value and benefit from the opportunity to perform. Therefore, organizations that

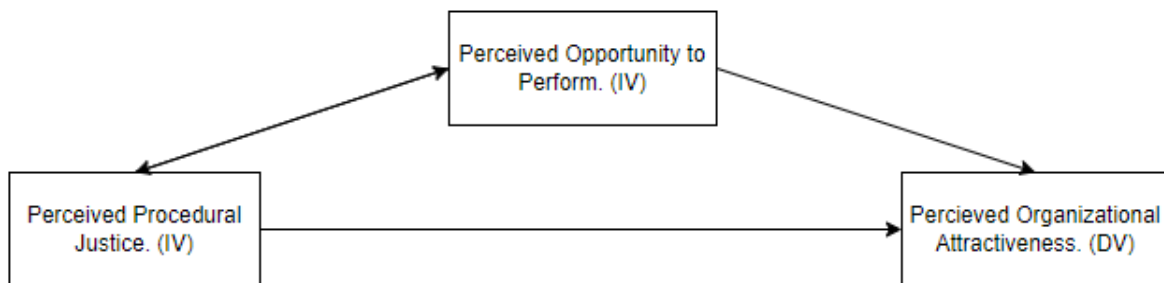
provide such opportunities in assessments are more likely to be perceived as attractive by potential candidates and employees. This led to the third hypothesis:

*Hypothesis 3: Perceived opportunity to perform during a game-based assessment mediates the effect of perceived procedural justice on perceived organizational attractiveness.*

Figure 1 shows a visual representation of the variables mentioned in the hypotheses and the relationship between them that will be researched.

### Figure 1

*Visual representation of the hypothesized relationships between the variables.*



## Method

### Participants

This study measures participants' reactions and attitudes to a GBA design. A convenience sample was used for this study in which the participants were recruited through a snowball sampling method within the social network of the researchers. In total 176 participants took part in the survey but only 109 participants completed all the questions in the survey. After screening out participants with incomplete assessment data the exclusion criteria was applied. Participants without secondary education as well as those under the age of 18 years old were excluded from the study. When data cleaning was concluded 73 participants were excluded from the study, leaving an effective sample size of  $N = 103$ .

The age of the participants ranged from 19 to 63 years with a mean age of 24.85 ( $SD = 8.55$ ). Within the sample 57.3% identified as female, 36.9% as male, 4.9% as other and 1%

chose not to disclose their gender. Additionally, the highest education level each person attained was assessed in the sample, with 36.9% university, 8.7% HBO, 1.9% MBO and 52.4% highschool. As well as the faculty of the last or current education, with 44.7% the faculty of Behavioral and Social Sciences, 18.4% from the faculty of Economics and Business, 30.1% from more than 6 different faculties and 6.8% not from a faculty. In addition, current employment status was measured, with 40.8% working part-time, 24.3% not working and not looking for work, 14.6% not working but looking for work, 13.6% working full-time, 5.8% self-employed and 1% unable to work. Lastly, prior job experience was measured where 92.2% had prior job experience and 7.8% did not.

### **Materials and Apparatus**

To conduct this study a GBA and a questionnaire were used. The GBA that was used is a demo version of a full version made by Equulture (2023). In the game the participants are shown a river with a ferry and some characters that need to cross from one side of the river to the other side, the goal is to complete this in as few moves as possible. The ferry has a set of rules, for this demo version the rules are: the ferry can only cross with at least one person on it and the ferry can only hold a combination of either one kid, two kids or one adult. The questionnaire that was used to assess the participants was hosted on Qualtrics. All materials were provided in English.

### **Design and Procedure**

We used a cross-sectional correlational design study, where the characteristics and reactions of the participants were recorded and analyzed in relation to each other. The participants received the questionnaire through snowball sampling and the questionnaire was shared through different forms of social media between 12 May 2023 and 30 May 2023. All participants were assigned to the same task and questionnaires. All conditions were the same for all participants, excluding the environment in which they completed the study. There were

various additional variables being collected to address the research questions of fellow researchers. It is believed that these items have no influence on the variables of interest. They were also asked the control questions: “Did you complete the game?” and “How many characters were needed to cross the river?”. We found that the latter was phrased poorly, so we have decided to exclude this question for our data cleaning.

A chance to win 30 euros after completion of the survey was shared as an incentive for participation. Participants received general information of the context of the study and were prompted to provide consent. First, participants completed a questionnaire which collected demographic information (age, student status, educational faculty, employment status, and job experience). Then, they received a generalized job posting for an operations analyst. After reading this, participants read a sample message from a recruiter thanking them for their time and interest in the job position. They then received the instructions of how to play the game and completed the game demo. Afterwards, they completed a questionnaire which measured their attitudes towards the game and organization. The opportunity to sign-up to win money was included at the end of the study.

### **Measures**

At the start of the questionnaire participants filled in their demographic information. This included information such as: age and job experience.

### ***Procedural justice***

To assess the participants’ procedural justice we used the subscales perceived propriety of task and job relatedness, with adapted items from the selection procedural justice scale (Bauer et al., 2001; Ellison et al., 2020) and adapted items from the four factors of organizational justice (Flint, 2012). The adaptations were mainly changing the wording from ‘question’ to ‘assessment’ or ‘test’. For perceived propriety of task a 3-item scale was used. The scale included items such as: “The assessment used objectively evaluates my

performance” (see appendix A). For perceived job relatedness a 4-item scale was used. In this scale were items such as: “It would be clear to anyone that this test is related to the job.”.

Cronbach’s alpha were  $\alpha = .92$  for the perceived propriety of task (Flint et al., 2012) and  $\alpha = .73$  for perceived job relatedness (Bauer et al., 2001).

### ***Perceived opportunity to perform***

To assess participants’ perceived opportunity to perform we used items adapted from the procedural justice scale (Bauer et al., 2001). The adaptations were mainly changing the wording from ‘question’ to ‘assessment’ or ‘test’. A 3-item scale was used, including items such as: “I’ve had an adequate opportunity to demonstrate skills within the task.”. The Cronbach alpha for perceived opportunity to perform was  $\alpha = .88$  (Bauer et al., 2001).

### ***Perceived organizational attractiveness***

Perceived organizational attractiveness was assessed using items from the organizational attraction questionnaire (Highhouse et al., 2003) and the selection procedural justice scale (Bauer et al., 2001). A 4-item scale was used, containing items such as: “A job at this company is very appealing to me.”. The cronbach alpha for organizational attractiveness was  $\alpha = .87$  (Bauer et al., 2001). The cronbach alpha’s of all subscales is above  $\alpha = .70$ , thus indicating good reliability. All scales used a seven point likert scale (1= strongly disagree, 7= strongly agree). Because this is part of a larger study, other variables were also measured in the questionnaire. These variables will not be looked at in this sub-research.

### **Data Analysis**

The data was cleaned by excluding people who did not finish the survey, people who said that they did not complete the game, two test cases and one person who did not fill in all subscales. The question ‘The task did not avoid aspects that were too personal or private’ was worded in a negative way, so the data from this question was re-coded. After the cleaning the mean of each subscale was calculated by taking the mean of all the answers on the questions

corresponding to the subscale. To get a better understanding of the data some descriptives of the variables were calculated and the correlational relation of the three variables was analyzed. Additionally the normality assumption was checked for all variables. Then, the total effect was estimated, this was done by conducting a simple linear regression with perceived procedural justice as the independent variable and perceived organizational attractiveness as the dependent variable, to confirm if the independent variable is a significant predictor of the dependent variable. Second, the direct effect was estimated by doing a simple linear regression with perceived procedural justice as the independent variable and perceived opportunity to perform as the dependent variable. This was done to confirm if the independent variable is a significant predictor of the mediator. Third, the indirect effect was estimated by conducting a multiple regression with perceived procedural justice and perceived opportunity to perform both as independent variables and perceived organizational attractiveness as the dependent variable. Last, a Sobel test was conducted with the outcomes of the second and the third step. These four steps were used to confirm that the mediator is a significant predictor of the dependent variable and the significance of the coefficient of the first step, the total effect, is now greatly decreased or no longer significant. For all regressions the assumptions of multicollinearity, homoscedasticity and normality were checked.

## **Results**

### **Descriptives**

As seen in Table 1, the results of perceived procedural justice, perceived opportunity to perform and perceived organizational attractiveness show nearly equal range and means. The lowest mean was that of perceived opportunity to perform and the highest mean was that of perceived organizational attractiveness. A test of normality showed that the distribution of perceived opportunity to perform departed significantly from normality ( $W = .957, p < .01$ ). In regression analysis, this can lead to disproportionate influence on parameter estimates and



confidence intervals being either too narrow or too wide. Perceived procedural justice showed no evidence for non-normality ( $W = .988, p = .458$ ) and perceived organizational attractiveness also showed no evidence for non-normality ( $W = .980, p = .128$ ). As seen in Figure A1, Figure A2, Figure A3 and Table 1 the distribution of perceived procedural justice is slightly skewed to the left and has a moderate chance to produce outliers. The distribution of perceived opportunity to perform is skewed to the right and has a very low chance to produce outliers. The distribution of perceived organizational attractiveness is skewed slightly to the left and also has a very low chance to produce outliers. Moderate positive correlations were found between perceived procedural justice and perceived organizational attractiveness, perceived opportunity to perform and perceived organizational attractiveness, as well as perceived procedural justice and perceived opportunity to perform.

**Table 1**

*Descriptive statistics and correlation matrix of Perceived procedural justice, Perceived opportunity to perform & Perceived organizational attractiveness.*

Variable	Min.	Max.	M	SD	Skewness		Kurtosis		1	2
					SE	SE	SE	SE		
1 Perceived procedural justice	1.17	6.25	3.7	.87	-.057	.238	.687	.472		
2 opportunity to perform	1.00	6.33	3.4	1.43	.325	.238	-.837	.472	.486*	
3 organizational attractiveness	1.25	6.50	4.1	1.19	-.011	.238	-.635	.472	.374*	.426*

Note. \* $p < .001$

### Hypothesis one

In the first hypothesis I proposed that: *Perceived procedural justice during game-based assessment has a positive effect on organizational attractiveness.* Based on the significant regression equation that was found ( $F(1,101) = 16.420, p < .001$ ), with an R

squared of .140 this hypothesis was supported. Participants perceived organizational attractiveness is equal to  $2.208 + .512$  (perceived procedural justice) mean points on the likert scale. Participants' perceived organizational justice increased by .512 for each point of mean perceived procedural justice. There was sufficient evidence to support the first hypothesis, thus participants who perceived a higher procedural justice during the GBA also perceived a higher organizational attractiveness, than participants who perceived a lower procedural justice. Checking the assumptions, for this analysis, showed an absence of multicollinearity (Tolerance = 1.000, VIF = 1.000), normally distributed residuals as seen in figure B1 and equally distributed residuals, see figure B2.

### **Hypothesis two**

In the second hypothesis I argued that: *Perceived opportunity to perform during game-based assessment has a positive effect on organizational attractiveness*. Based on the significant result, the regression equation found that the relationship was significant ( $F(1,101) = 22.437, p < .001$ ), with an R squared of .182. Participants predicted perceived organizational attractiveness is equal to  $2.916 + .357$  (perceived opportunity to perform) mean points. Participants' perceived organizational justice increased by .357 for each point of mean perceived opportunity to perform. Hypothesis two was also confirmed. Thus participants who perceived a higher opportunity to perform during the GBA also perceived a higher organizational attractiveness. Checking the assumptions, for this analysis, showed an absence of multicollinearity (Tolerance = 1.000, VIF = 1.000), normally distributed residuals as seen in Figure C1 and equally distributed residuals (see Figure C2).

### **Hypothesis three**

In the third hypothesis I argued that: *Opportunity to perform mediates the effect of perceived procedural justice on organizational attractiveness*. As seen in Table 2 there was a significant total effect between perceived procedural justice and perceived organizational

attractiveness and a significant direct effect between perceived procedural justice and perceived opportunity to perform. When looking at the indirect effect of perceived procedural justice on perceived organizational attractiveness, with perceived opportunity to perform as a mediator, the effect did reduce when compared to the total effect, but did not reduce enough to be no longer significant. However, the Sobel test for the indirect effect of perceived opportunity to perform is  $z = 2.75, p = .006$ ; therefore, it can be concluded that partial mediation occurred between perceived procedural justice on perceived organizational justice via perceived opportunity to perform, thus hypothesis three was partially supported.

Checking the assumptions, for this analysis, showed an absence of multicollinearity for both the direct effect (Tolerance = 1.000, VIF = 1.000) and the total effect (Tolerance = .763, VIF 1.310), normally distributed residuals as seen in Figure D1 and D2 and equally distributed residuals (see Figure D3 and D4).

**Table 2.**

*Results of the mediation analysis*

Effect	Path	Unstandardized Coefficients		95% CI		F	p
		B	SE	Lower	Upper		
Total	Procedural Justice > Organizational Attractiveness	.512	.126	.262	.763	16.420	<.001
Direct	Procedural Justice > Opportunity to Perform	.796	.142	.514	1.078	31.293	<.001
Indirect	Procedural Justice > Opportunity to Perform > Organizational Attractiveness	.299	.139	.100	.436	13.948	.033

**Discussion**

This study examined the influence of GBA on applicant attitudes and behavior in a selection setting. Based on the literature about perceptions of the selection procedure and the positive influence on job acceptance and perceptions of organizational attractiveness (Bauer et al., 1998, 2001; Singer, 1993), it was proposed that procedural justice has a positive effect on organizational attractiveness. In line with the research on the importance of opportunity to

perform as a predictor of perceived fairness and the positive relationship between selection fairness and organizational attractiveness (Gilliland, 1993; Schleicher et al., 2006; Singer, 1993; Truxillo et al., 2001), the hypothesis that opportunity to perform positively affects organizational attractiveness was put forth. The last hypothesis in which opportunity to perform was argued to be a mediator for the relationship between procedural justice and organizational attractiveness. This was based on the findings that experiencing comfort in GBA, resulted in the positive effect of procedural justice on organizational attractiveness to be strengthened. In which comfort means being comfortable in the GBA by having prior experience in game mechanics or work mechanics relevant to the assessment. (Elisson et al., 2020; Gkorezis et al., 2021; Landers & Sanchez, 2022; Singer, 1993).

The results from the study showed evidence for the positive influence of procedural justice on organizational attractiveness and thereby supporting Hypothesis 1. Experiencing the procedure of the selection as fair made people see the organization as more attractive which aligns with Singer's (1993) study, in which a questionnaire was issued to a random sample of 110 male professional managers. In the questionnaire were questions about assessment characteristics, if they got offered a job, if they took the offer, organizational attractiveness and other variables. Finding that fairness of selection processes affected job acceptance and organizational attractiveness. The hypothesis stating that opportunity to perform has a positive effect on organizational attractiveness, was also supported by the results from this study. Therefore applicants experiencing that they are able to use their strengths and abilities during the assessment process makes them view the organization as more attractive and, according to the literature, will more likely accept a job offer from the company (Macan et al., 1994; Singer, 1993). The obtained results also showed that Hypothesis 3 is only partially supported therefore, opportunity to perform is only a partial mediator for the relationship between procedural justice and organizational attractiveness.

This suggests that when individuals experience the procedure of the assessment as fair, they perceive a higher opportunity to perform, which in turn, partially enhances perceived attractiveness of the organization. Which aligns similarly with the study of Ellison et al. (2020), wherein they had a sample of 374 participants, who completed cognitive GBA's and questionnaires about procedural fairness, organizational attractiveness, technological self-efficacy, game experience and other variables. With this study they found that "Fairness mediated the relationship between procedural justice rules and willingness to recommend the company to others. Technology self-efficacy was significantly related to fairness perceptions and procedural justice perceptions" (Ellison et al., 2020, p. 241).

### **Implications**

An important theoretical implication of this study's findings is that it paves a way to future research, by finding relations in applicant reactions when using GBAs, for which little to no research has been published. Specifically, the partially mediating relationship of opportunity to perform on the effect of procedural justice on organizational attractiveness. This also raises the question if this relationship has other mediators. It also emphasizes the importance of focusing on applicant reactions when designing and researching GBA. Furthermore, the findings are in line with the research the hypotheses are based on, support for the effect of procedural justice on organizational attractiveness (Bauer et al., 1998, 2001; Singer, 1993), for the effect of opportunity to perform on organizational attractiveness (Gilliland, 1993; Schleicher et al., 2006; Singer, 1993; Truxillo et al., 2001). Additionally the findings also add to the fact that, the used frameworks and theories in this study also apply to the new method of GBA. This makes the previous research more solid as it demonstrates the possible generalizability across different organizational settings.

Companies should make their GBAs more procedurally fair, by making the assessed task more similar to the relevant job functions, as well as more objective and proper. In turn

making more people accept the company's job offer (Singer, 1993), giving the company more opportunity to select qualified personnel. Companies should increase the opportunity to perform for participants, by having equal changes for the participants to demonstrate their skills and abilities. Thereby increasing the perceived fairness and comfort of the assessment and thus increasing the organizational attractiveness (Ellison et al., 2020; Gkorezis et al., 2021; Landers & Sanchez, 2022; Singer, 1993; Truxillo et al., 2001).

### **Limitations and suggestions**

One limitation of the study is that this assessment was not part of a real selection setting, which means there are no consequences for the participants. As a result, participants might not have tried hard enough or did not pay enough attention in the GBA. Possibly making their experiences with the variables less prominent, for example the fairness of the procedure might seem alright during this study, when there is no job offer on the line, but can be evaluated as less fair during a selection process. This is a common trend in the research on assessment, since it is logistically hard to pull off and real companies may conduct their own inhouse studies on their assessment. A suggestion for future research would be to ask the company or institution which hosts the research for the research to be conducted internally, in turn bettering their assessment procedures.

Another limitation of the study is that the variable perceived opportunity was not normally distributed enough to satisfy the normality assumption. However, the normality assumptions for the linear regressions were not violated. A violation of the assumption can still make the outcomes of the results less reliable and less generalizable. This might have been caused by the logistical problem of only having a demo of the GBA, causing the GBA to be finished quickly, therefore, this short amount of time might have polarized the experience of opportunity to perform. This logistical problem was mainly because of a low amount of funds and the low amount of publicly accessible GBAs. A suggestion for future

research is either having a full GBA or a larger sample size, making the scores of opportunity to perform more normally distributed (Cam, 1986). A strength from this study is there is still little known about the application of the discussed theories and frameworks in the context of GBAs, making these findings a foundation for future research.

### **Conclusion**

This study examined the influence of game-based assessment on applicant attitudes and behavior in a selection setting. We explored whether procedural fairness had an effect on organizational attractiveness, with the use of game-based assessment. The results from the study showed evidence for the positive influence of procedural justice on organizational attractiveness. Additionally, the positive effect of opportunity to perform on organizational attractiveness, was also found in the results from this study. Along with, The results that opportunity to perform is only a partial mediator for the relationship between procedural justice and organizational attractiveness. Taking all the results together, support was found for an increase in organizational attractiveness, when a high procedural justice was experienced during game-based assessment, also partially via an experience of high opportunity to perform.

## References

- Armstrong, M. B., Landers, R. N., & Collmus, A. B. (2016). Gamifying recruitment, selection, training, and performance management: game-thinking in human resource management in Davis, D. and Gangadharbatla, H. (Eds), *Handbook of Research on Trends in Gamification*, Information Science Reference, Hershey, PA, pp. 140-165.
- Arvey, R. D., & Sackett, P. R., (1993). Fairness in selection: Current developments and perspectives. In N. Schmitt & W. Borman (Eds.), *Personnel selection* (pp. 171–202). San Francisco: Jossey-Bass.
- Bauer, T. N., Maertz, C., Dolen, M., & Campion, M. A. (1998). A longitudinal assessment of applicant reactions to an employment test. *Journal of Applied Psychology*, *83*, 892-903.
- Bauer, T. N., Truxillo, D. M., Sanchez, R. J., Craig, J. S., Ferrara, P., & Campion, M. A. (2001). APPLICANT REACTIONS TO SELECTION: DEVELOPMENT OF THE SELECTION PROCEDURAL JUSTICE SCALE (SPJS). *Personnel Psychology*, *54*(2), 387–419. <https://doi.org/10.1111/j.1744-6570.2001.tb00097.x>
- Bhatia, S. (2018), Applicant Reactions to Game-Based Assessments: the Effects of Flow, Fairness, and Fit, (*Doctor of Philosophy*), Michigan State University, Lansing, MI.
- Borman, T. C., Dunlop, P. D., Gagné, M., & Neale, M. (2023). Improving Reactions to Forced-Choice Personality Measures in Simulated Job Application Contexts Through the Satisfaction of Psychological Needs. *Journal of Business and Psychology*. <https://doi.org/10.1007/s10869-023-09876-w>
- Cam, L., L. (1986). The central limit theorem around 1935. *Statistical science*, 78-91.
- Chapman, D. S., Uggerslev, K. L., Carroll, S. A., Piasentin, K. A., & Jones, D. A.(2005). Applicant attraction to organizations and job choice: A meta-analytic review of the correlates of recruiting outcomes. *Journal of Applied Psychology*, *90*(5), 928–944.



- Chow, S., & Chapman, D. (2013). Gamifying the employee recruitment process. *Paper presented at the Proceedings of the First International Conference on Gameful Design, Research, and Applications.*
- Collmus, A. B., Armstrong, M. R., & Landers, R. (2016). Game thinking within social media to recruit and select job candidates. *Springer eBooks*, 103–124.  
[https://doi.org/10.1007/978-3-319-29989-1\\_6](https://doi.org/10.1007/978-3-319-29989-1_6)
- Ellison, L., Johnson, T., Tomczak, D. L., Siemsen, A., & Gonzalez, M. A. (2020). Game on! Exploring reactions to game-based selection assessments. *Journal of Managerial Psychology*, 35(4), 241–254. <https://doi.org/10.1108/jmp-09-2018-0414>
- Equalture. (2023). Equalture - Objective hiring through neuroscience. Equalture - For the Pioneers Who Are No Longer Willing to Accept the Flaws of CV-Based Hiring.  
<https://www.equalture.com/>
- Flint, D., Haley, L., & McNally, J. J. (2012). Dimensionality of Organizational Justice in a call center context. *Psychological Reports*, 110, 677–693.  
<https://doi.org/10.2466/01.07.21.PR0.110.2.677-693>
- Folger R., & Greenberg, J. (1985). Procedural justice: An interpretive analysis of personnel systems. In Rowland, K. & Ferris, G. R. (Eds.), *Research in personnel and human resources management* (Vol. 3, pp. 141-183). JAI Press.
- Garris, R., Ahlers, R., & Driskell, J. E. (2002), Games, motivation, and learning: a research and practice model. *Simulation & Gaming*, 33, 441-467.
- Gilliland, S. W. (1993). The perceived fairness of selection systems: An Organizational Justice Perspective. *Academy of Management Review*, 18(4), 694–734.  
<https://doi.org/10.5465/amr.1993.9402210155>

- Gilliland, S. W., & Hale, J. M. S. (2005). How can justice be used to improve employee selection practices? In Greenberg J, Colquitt JA (Eds.), *Handbook of organizational justice* (pp. 411–438). Erlbaum.
- Gkorezis, P., Georgiou, K., Nikolaou, I. E., & Kyriazati, A. (2021). Gamified or traditional situational judgement test? A moderated mediation model of recommendation intentions via organizational attractiveness. *European Journal of Work and Organizational Psychology, 30*(2), 240–250.  
<https://doi.org/10.1080/1359432x.2020.1746827>
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? A literature review of empirical studies on gamification. *Paper presented at the System Sciences (HICSS), 2014 47th Hawaii International Conference.*
- Hausknecht, J. P., Day, D. V., & Thomas, S. C. (2004), Applicant reactions to selection procedures: an updated model and meta-analysis. *Personnel Psychology, 57*, 639-683.
- Highhouse, S., Lievens, F., & Sinar, E. F. (2003). Measuring Attraction to Organizations. *Educational and Psychological Measurement, 63*(6), 986–1001.  
<https://doi.org/10.1177/0013164403258403>
- Landers, R., & Sanchez, D. T. (2022). Game-based, gamified, and gamefully designed assessments for employee selection: Definitions, distinctions, design, and validation. *International Journal of Selection and Assessment, 30*(1), 1–13.  
<https://doi.org/10.1111/ijsa.12376>
- Leclercq, T., Poncin, I., Hammedi, W., Kullak, A., & Hollebeek, L. D. (2020). When gamification backfires: the impact of perceived justice on online community contributions. *Journal of Marketing Management, 36*(5–6), 550–577.  
<https://doi.org/10.1080/0267257x.2020.1736604>

- Leutner, F., Codreanu, S., Brink, S., & Bitsakis, T. (2023). Game based assessments of cognitive ability in recruitment: Validity, fairness and test-taking experience. *Frontiers in Psychology, 13*. <https://doi.org/10.3389/fpsyg.2022.942662>
- Macan T. H., Avedon M. J., Paese M., Smith D. E. (1994). The effects of applicants' reactions to cognitive ability tests and an assessment center. *Personnel Psychology, 47*, 715–738.
- Mumford, M. D., Baughman, W. A., Supinski, E. P., & Anderson, L. E. (1998). A construct approach to skill assessment: Procedures for assessing complex cognitive skills. In M. D. Hakel (Ed.), *Beyond multiple choice: Evaluating alternatives to traditional testing for selection* (pp. 75–112). Mahwah, NJ: Erlbaum.
- Murphy K. R. (1986). When your top choice turns you down: Effect of rejected job offers on the utility of selection tests. *Psychological Bulletin, 99*, 133–138.
- Nikolaou, I. E., Georgiou, K., Bauer, T. N., & Truxillo, D. M. (2019). Applicant Reactions in Employee Recruitment and Selection. *Cambridge University Press EBooks*, 100–130. <https://doi.org/10.1017/9781108649636.006>
- Nikolaou, I., Georgiou, K., & Kotsaralidou, V. (2019). Exploring the Relationship of a Gamified Assessment with Performance. *The Spanish Journal of Psychology, 22*, E6. doi:10.1017/sjp.2019.5
- Pandeliiev, V. T., & Baecker, R. M. (2010). A framework for the online evaluation of serious games. *Proceedings of the International Academic Conference on the Future of Game Design and Technology*, 239-242. Vancouver, British Columbia, Canada: ACM
- Potočník, K., Anderson, N., Born, M. P., Kleinmann, M., & Nikolaou, I. E. (2021). Paving the way for research in recruitment and selection: recent developments, challenges and future opportunities. *European Journal of Work and Organizational Psychology, 30*(2), 159–174. <https://doi.org/10.1080/1359432x.2021.1904898>

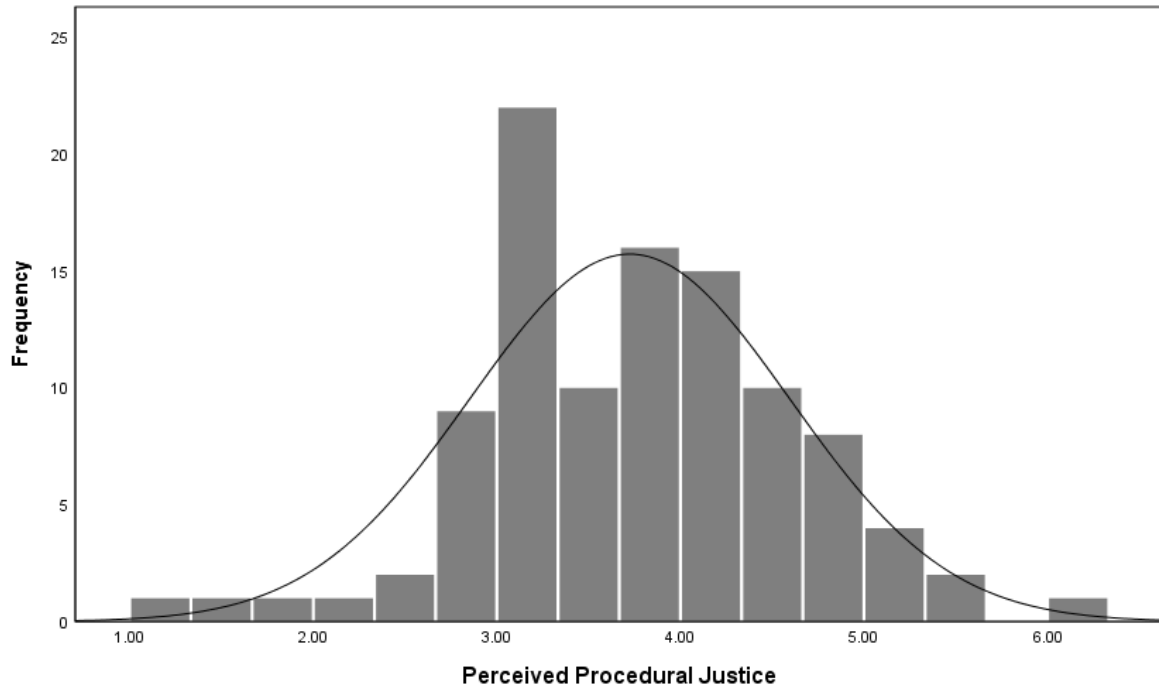
- Reiners, T., & Wood, L. C. (2014). *Gamification in Education and Business*. Springer.
- Roberson, Q. M., Collins, C. M., & Oreg, S. (2005). The effects of recruitment message specificity on applicant attraction to organizations. *Journal of Business and Psychology, 19*(3), 319–339. <https://doi.org/10.1007/s10869-004-2231-1>
- Ryan, A. M., & Ployhart, R. E. (2000). Applicants' perceptions of selection procedures and decisions: A critical review and agenda for the future. *Journal of Management, 26*, 565–606.
- Ryan, A. M., & Ployhart, R. E. (2014). A century of selection. *Annual Review of Psychology, 65*(1), 693–717.
- Rynes, S. L. (1993). Who's selecting whom? Effects of selection practices on applicant attitudes and behavior. In Schmitt N, Borman WC, & Associates (Eds.), *Personnel Selection in Organizations* (pp. 240–274). San Francisco: Jossey-Bass.
- Schleicher, D. J., Venkataramani, V., Morgeson, F. P., & Campion, M. A. (2006). So you didn't get the job . . . Now what do you think? Examining opportunity-to-perform fairness perceptions. *Personnel Psychology, 59*(3), 559–590.  
<https://doi.org/10.1111/j.1744-6570.2006.00047.x>
- Schmidt, F. L., & Hunter, J. E. (1998), The validity and utility of selection methods in personnel psychology: practical and theoretical implications of 85 years of research findings. *Psychological Review, 124*, 262-274.
- Singer, M. (1993). *Fairness in Personnel Selection: An Organizational Justice Perspective*. Avebury.
- Smither, J. W., Reilly, R. R., Millsap, R. E., Pearlman, K., & Stoffey, R. W. (1993). Applicant reactions to selection procedures. *Personnel Psychology, 46*, 49–76.

- Stone, D. L., Deadrick, D. L., Lukaszewski, K. M., & Johnson, R. (2015). The influence of technology on the future of human resource management. *Human Resource Management Review, 25*(2), 216–231.
- Thibaut, J. W., & Walker, W. L. (1975). *Procedural justice: A psychological analysis*. Lawrence Erlbaum Associates, Inc.
- Truxillo, D. M., Bauer, T. N., & Sanchez, R. J. (2001). Multiple dimensions of procedural justice: Longitudinal effects on selection system fairness and test-taking self-efficacy. *International Journal of Selection and Assessment, 9*, 336–349.
- Wu, F. F., Mulfinger, E., Alexander, L., Sinclair, A. L., McCloy, R. A., & Oswald, F. L. (2021). Individual differences at play: An investigation into measuring Big Five personality facets with game-based assessments. *International Journal of Selection and Assessment, 30*(1), 62–81. <https://doi.org/10.1111/ijsa.12360>

## Appendix

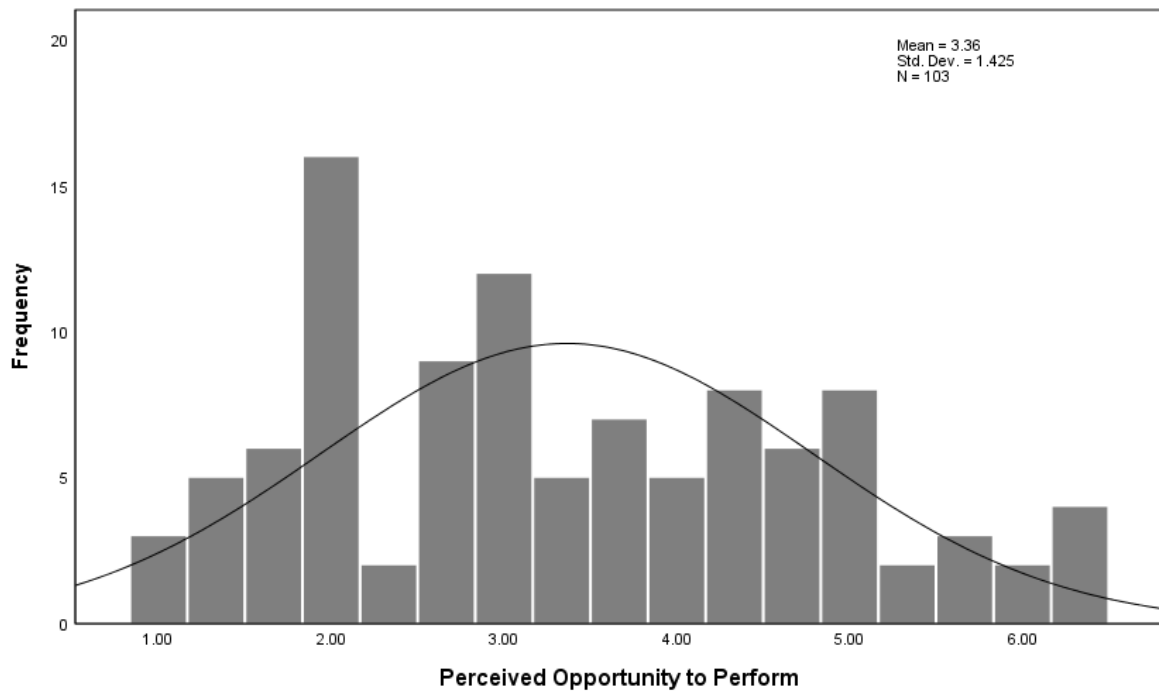
**Figure A1.**

*Histogram and distribution curve of mean scores of Perceived Procedural Justice.*



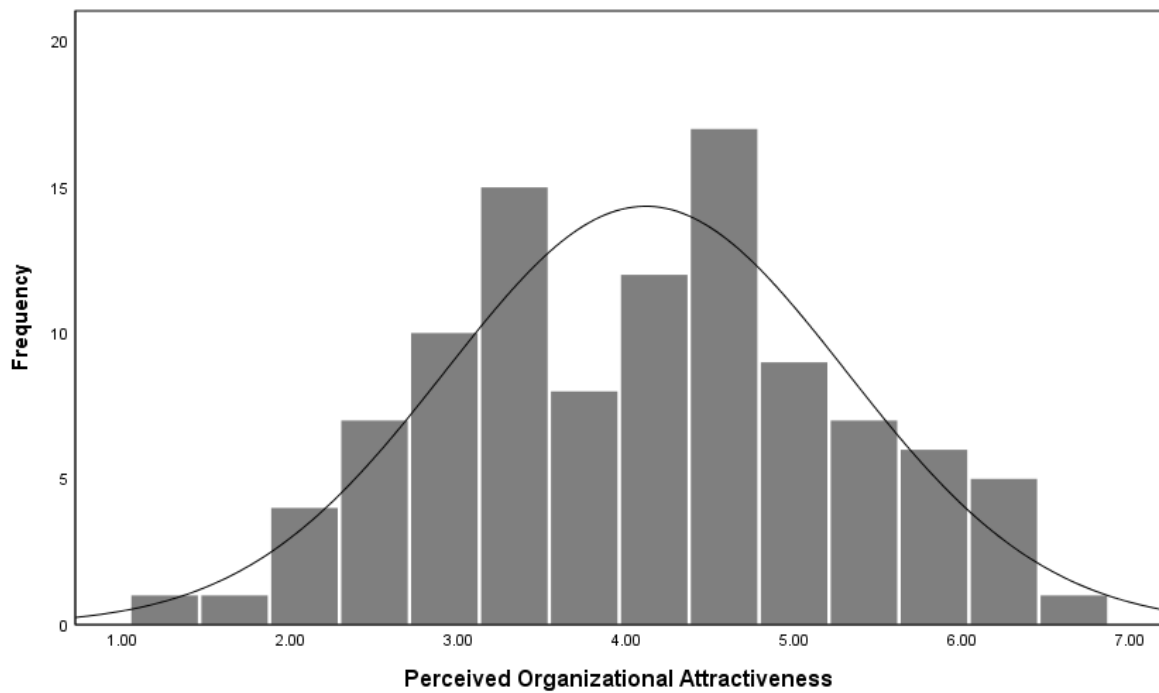
**Figure A2.**

*Histogram and distribution curve of mean scores of Perceived Opportunity to Perform.*

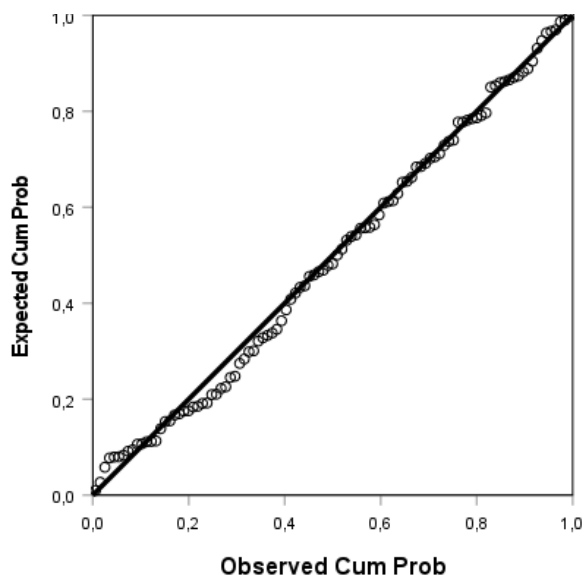


**Figure A3.**

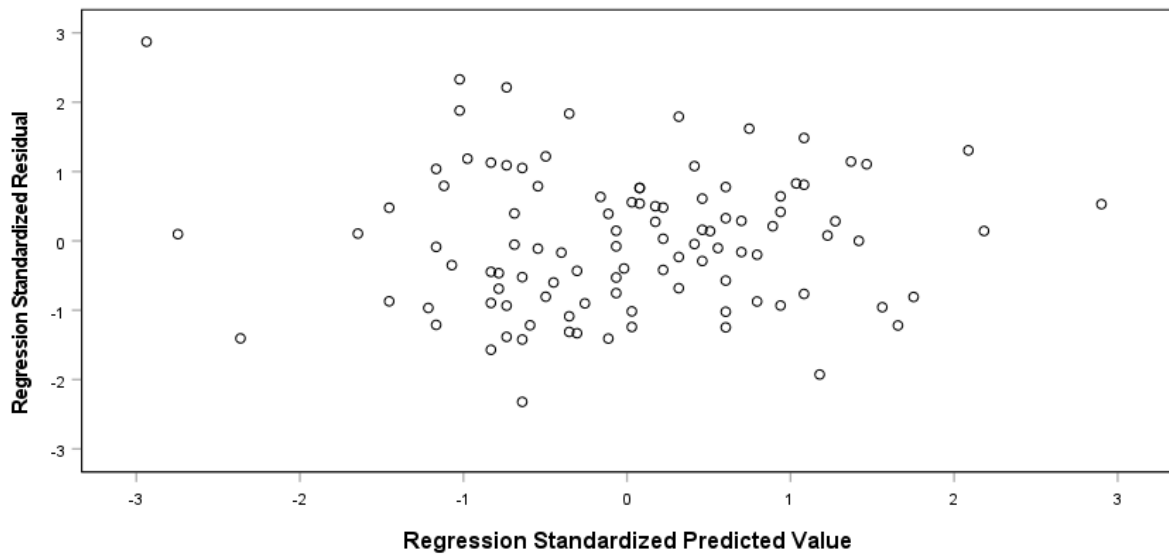
*Histogram and distribution curve of mean scores of Perceived Organizational Attractiveness.*

**Figure B1.**

*Normal P-P plot of regression standardized residual, with Perceived Procedural Justice as the independent variable and Perceived Organizational Justice as the dependent variable.*

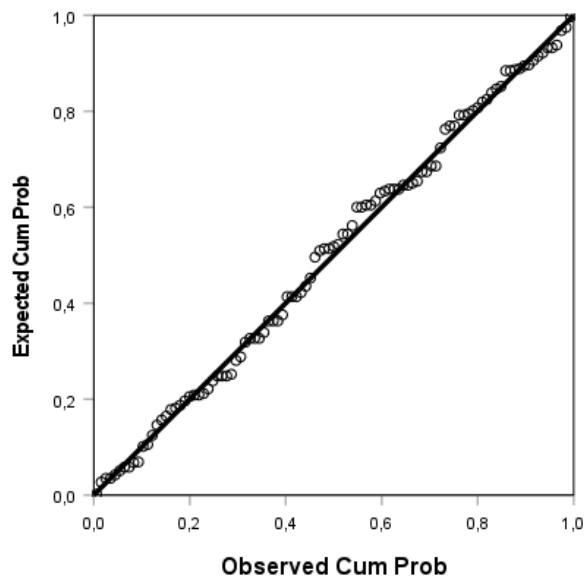
**Figure B2.**

*Residual plot with Perceived Procedural Justice as the independent variable and Perceived Organizational Justice as the dependent variable.*



**Figure C1.**

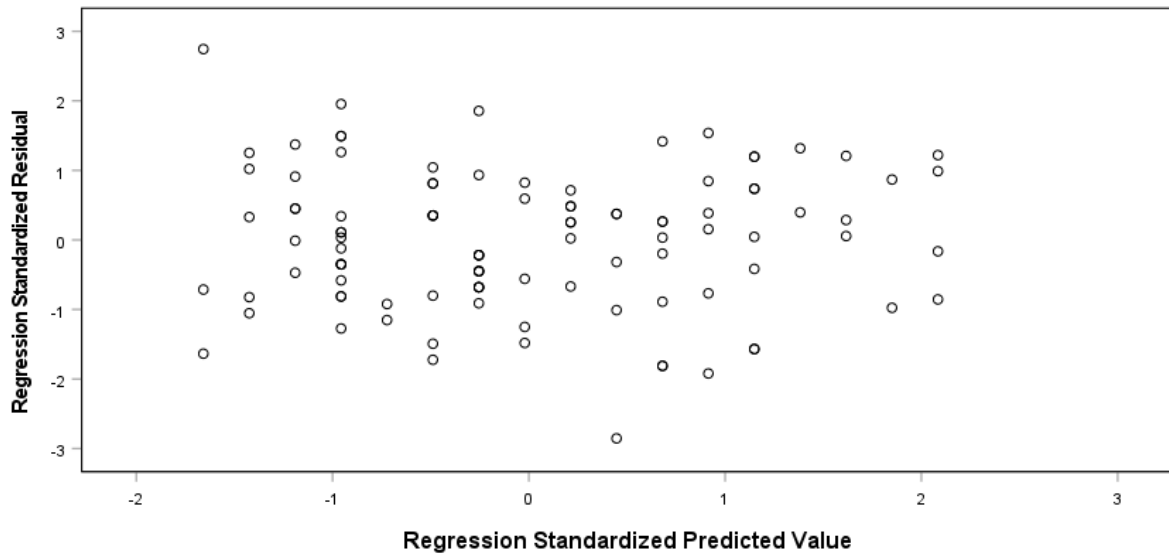
*Normal P-P plot of regression standardized residual, with Perceived Opportunity to Perform as the independent variable and Perceived Organizational Attractiveness as the dependent variable.*



**Figure C2.**

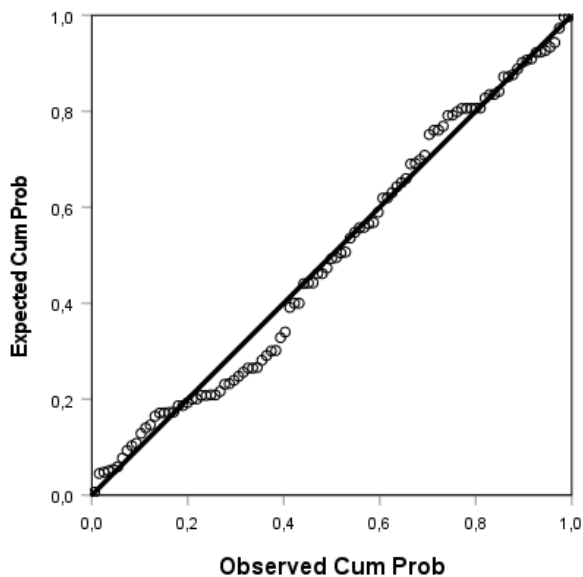


*Residual plot with Perceived Opportunity to Perform as the independent variable and Perceived Organizational Attractiveness as the dependent variable.*



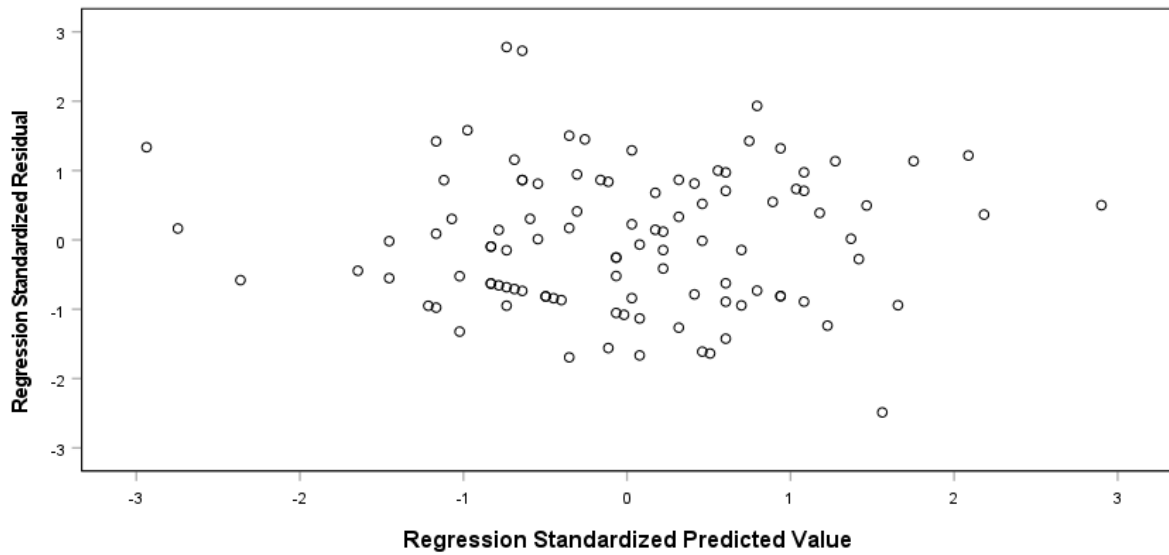
**Figure D1.**

*Normal P-P plot of regression standardized residual, with Perceived Procedural Justice as the independent variable and Perceived Opportunity to Perform as the dependent variable.*



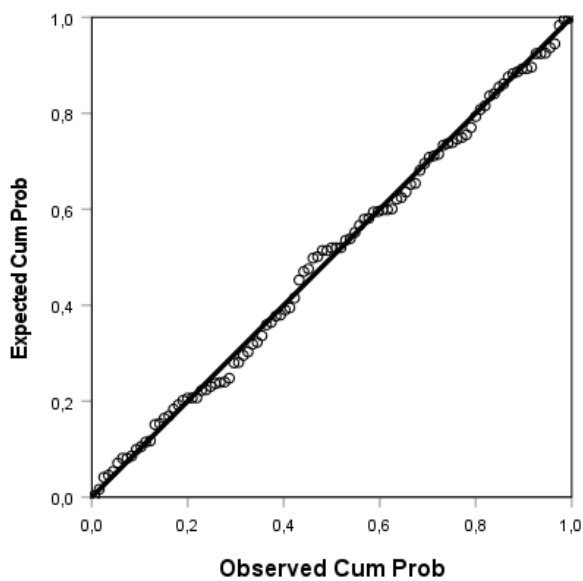
**Figure D2.**

*Residual plot with Perceived Procedural Justice as the independent variable and Perceived Opportunity to Perform as the dependent variable.*



**Figure D3.**

*Normal P-P plot of regression standardized residual, with Perceived Procedural Justice and Perceived Opportunity to Perform as the independent variables and Perceived Organizational Attractiveness as the dependent variable.*



**Figure D4.**

*Residual plot with Perceived Procedural Justice and Perceived Opportunity to Perform as the independent variables and Perceived Organizational Attractiveness as the dependent variable.*

